

# Sensor Module for the FloBoss™ 504 Flow Manager

The FloBoss 504 Flow Manager is designed for measuring gas flow in turbine metering applications in which a single or dual pulse train is generated from a single rotor.

The Sensor Module accumulates single or dual pulse counts from the turbine meter (typically via a pre-amp) and performs error checking/ correction. In addition, the SM has a static pressure sensor and an optional auxiliary pressure sensor built into it.

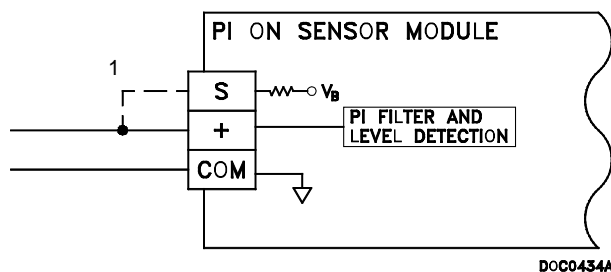
The Sensor Module provides volumetric flow measurement for a turbine meter used to measure the flow in a single meter run and can be configured for Metric or English units of measurement. The Sensor Module provides terminals for its pulse counter (PI) inputs from a turbine meter, and senses static (line) and auxiliary pressures from direct process connections.

The primary inputs used for turbine flow calculations are pulse counter, static pressure, and temperature. The single or dual pulse-count inputs are taken from a single-rotor turbine meter, the static pressure input comes from a process connection to the Sensor Module (SM), and the temperature input is acquired directly from an RTD probe.

The SM can count pulses acquired from a turbine meter, read and convert pressure, store the pulse count and the pressure values temporarily, and communicate the values to the FloBoss.

The Sensor Module measures static pressure by converting the applied pressure to electrical signals; in addition, it counts (and checks) pulses applied to its Pulse Input terminals. A factory-installed ribbon cable enables all readings from the sensor to be available to the Main Electronics Board. The readings from the SM are configured as two Analog Input points and two Pulse Input points.

The SM informs the Main Electronics Board that it is ready for an update at least once per second. The FloBoss converts this value and stores it in the proper Pulse Input and Analog Input for access by other functions within the FloBoss. If an update does not occur in ten seconds, the sensor is re-initialized. A Point Fail alarm is set if the sensor does not respond to the initialization. Calibration is performed through the PI and AI routines.



1. Connect this wire only for a contact closure from relay contacts or a solid state relay with an open collector or open drain.

*Pulse Input Wiring Schematic*

**Sensor Module Specifications**

**PULSE COUNTER INPUTS**

**Quantity and Type:** 2 voltage-sensing inputs.  
**Field Wiring Terminals:** S, +, COM.  
**Source Power:** Voltage is 12 Vdc max.; current is 1 mA max (designed for contact closure device).  
**Range:** Inactive, 0 to 1.0 Vdc; active, 3.5 Vdc minimum.  
**Minimum Pulse Width:** 100 µsec under 1 kHz.  
**Frequency and Phase:** For Level A integrity, phase between pulse inputs must be between 45 and 315 degrees and frequency between 101 and 2000 Hz, qualified as follows:  
 At 45 (315) degrees, 1250 Hz max.  
 At 90 (270) degrees, 1500 Hz max.  
 At 180 degrees, 2000 Hz max.  
 For Level B integrity, phase must be between 45 and 315 degrees and frequency between 101 and 3000 Hz, with Level B phase error at 15% max. For Level C, D, or E integrity, frequency is 10 kHz max.

**INTEGRATED PRESSURE INPUTS (OPTIONAL)**

**Quantity and Type:** Up to two pressure sensors, selected from ranges in table below. All are gauge pressure inputs, except for the 0 - 1000 PSI sensor.  
**Accuracy (Typical)<sup>1</sup>:** ±0.5% of span from -20 to 50°C (4 to 122°F).

**DIMENSIONS**

**FloBoss 504:** 420 mm H by 350 mm W by 184 mm D (16.56 in. H by 13.80 in. W by 7.25 in. D). Height includes top mounting flange and SM.

**CONSTRUCTION (FLOBOSS 504)**

Housing is 316 SST with Poron gasket between housing and controller enclosure.

**PROCESS CONNECTIONS**

1/4-18 NPT female on 1.56-inch center, located on bottom surface.

**WEIGHT (FLOBOSS 504)**

10.4 kg (23 lb) nominal, including SM, but excluding batteries (not supplied). AC Power Supply adds 0.82 kg (1.8 lb).

**ENVIRONMENTAL**

Meets Environmental Specifications for the FloBoss 504 main electronics. Refer to Specification Sheet 3:FB504.

**APPROVALS (FLOBOSS 504)**

Approved by CSA as Model W40079 for hazardous locations Class I, Division 2, Groups A, B, C, and D.

| Pressure Input Range         | Accuracy <sup>1</sup><br>(-20 to 50°C) | Proof Pressure        | Burst Pressure        |
|------------------------------|--|-----------------------|-----------------------|
| 0 - 5 PSIG (0 - 35 kPa)      | ± 0.5%                                 | 15 PSIG (103 kPa)     | 25 PSIG (172 kPa)     |
| 0 - 30 PSIG (0 - 207 kPa)    | ± 0.5 %                                | 90 PSIG (620 kPa)     | 150 PSIG (1034 kPa)   |
| 0 - 100 PSIG (0 - 689 kPa)   | ± 0.5 %                                | 300 PSIG (2068 kPa)   | 500 PSIG (3447 kPa)   |
| 0 - 300 PSIG (0 - 2068 kPa)  | ± 0.5 %                                | 900 PSIG (6205 kPa)   | 1500 PSIG (10340 kPa) |
| 0 - 500 PSIG (0 - 3447 kPa)  | ± 0.5 %                                | 1200 PSIG (8273 kPa)  | 2400 PSIG (16540 kPa) |
| 0 - 1000 PSIA (0 - 6894 kPa) | ± 0.5 %                                | 3000 PSIA (20680 kPa) | 5000 PSIA (34470 kPa) |

1. Better accuracy is available using a FloBoss 500-Series I/O Board with off-board transmitters.

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